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To: Therkorn, Ernest
Subject: Proposed amendment of Serial No. 09/979,576, our dkt. 34156

Serial No. 09/979,576
Art Unit: 1723

We discussed this case by telephone this morning. The proposed claim amendments are set forth below for your review prior to a subsequent telephone interview. Please call me at your convenience.

Each of independent claims 1, 11 and 19 is to be amended to emphasize the front divergent portion of the internal flow conduit as previously set forth in claim 19, lines 22-24, and claim 22. Such a construction is not shown in US Patent 3,826,373 to Andreotti which is cited in connection with the hollow plunger.

Dependent claims 12 and 22 are to be amended to delete redundant language. Claim 19 is to be amended to confirm that the first end of the column tube is closed by the plunger.

Proposed Claim Amendments:

1. A chromatography column having a column tube and end filter arrangements which, in use, retain a bed of particulate chromatography medium in the column tube between them while allowing the passage of fluid for chromatography;

at least one of the end filter arrangements being at the front end of a plunger which is axially slidable along inside the column tube, makes a seal outwardly against the tube and incorporates an internal flow conduit communicating along the plunger between a permeable filter portion of the respective end filter arrangement and a rear part of the plunger outside the column tube;

the plunger comprising a tubular stem of glass or thermoplastic material which defines in one piece said internal flow conduit including an integral front divergent portion, the permeable filter portion being integrally bonded to the front end of the tubular stem across the front divergent portion of the internal flow conduit, and an outer plunger wall spaced outwardly from said tubular stem defining at locations rearward of the front divergent portion of the internal flow conduit, the outer plunger wall and tubular stem being integrally bonded to one another at the front end of the plunger around said tubular stem at the front divergent portion so as to seal off an internal space at the front end of the plunger, around said tubular stem, at the front end thereof.

11. A chromatography column having a column tube and end filter arrangements which, in use, retain a bed of particulate chromatography medium in the column tube between them while allowing the passage of fluid for chromatography;

at least one of the end filter arrangements being at the front end of a plunger which is axially slidable along inside the column tube, makes a seal outwardly against the tube and incorporates an internal flow conduit communicating along the plunger between a permeable filter portion of the respective end filter arrangement and a rear part of the plunger outside the column tube;

the plunger comprising a tubular glass stem which defines said internal flow conduit including an integral front divergent portion, the permeable filter portion being a sintered glass element integrally fused to the plunger stem around said tubular stem at the front divergent portion so as to seal off an internal space at the front end of the plunger.

12. A chromatography column according to claim 11 in which the plunger further comprises an outer plunger wall spaced outwardly from said tubular stem defining the internal flow conduit at locations rearward of the divergent portion, the outer plunger wall and tubular stem being integrally bonded to one another at the front end of the plunger so as to seal off an internal space of the plunger, around said tubular stem, at the front end of the plunger.

19. A chromatography column comprising a column tube and a self-aligning plunger axially slidably receivable in the column tube;

the column tube having a first end with a full-diameter opening closed by removably receiving the plunger and a second, closed end converging to a union for an external fluid flow conduit;

a fixed permeable filter element being provided across the column tube adjacent the second, closed end, to retain in use one end of a bed of particulate chromatography medium in the column tube while allowing the passage to said union of fluid for chromatography;

the plunger having a front end slidable inside the column tube and a rear end outside the column tube, the front end of the plunger comprising a further permeable filter element which retains in use the other end of a said bed of particulate chromatography medium in column tube, and the rear end of the plunger having a rear fluid connection union;

the plunger comprising a tubular stem of glass or thermoplastic material which defines in one piece an internal flow conduit extending in the plunger from the rear fluid connection union to the permeable filter element, and having an integral front divergent portion across which the permeable filter element is disposed, the plunger further comprising an outwardly-directed sealing portion making a slidable seal engagement against the column tube wall, with an alignment structure of the plunger making an axially-elongate fitting engagement with the column tube wall to align the plunger axially in the column tube;

the plunger's permeable filter element being of glass or thermoplastic material and integrally bonded around so as to seal off an internal space at the front end of the plunger.

22. A chromatography column according to claim 19 in which said alignment structure of the plunger is provided by an outer cylindrical plunger wall spaced outwardly from said tubular stem at locations rearward of the divergent portion, the outer plunger wall, tubular stem and permeable filter element being connected to one another by integral fusing of their glass or thermoplastic material to seal off an the internal space of the plunger, around said tubular stem, at the front end of the plunger.